

## **§ 31.51**

allow proper performance of its functions. Controls must be arranged and identified to provide for convenience of operation and to prevent the possibility of confusion and subsequent inadvertent operation.

(b) Each control system and operating device must be designed and installed in a manner that will prevent jamming, chafing, or interference from passengers, cargo, or loose objects. Precaution must be taken to prevent foreign objects from jamming the controls. The elements of the control system must have design features or must be distinctly and permanently marked to minimize the possibility of incorrect assembly that could result in malfunctioning of the control system.

(c) Each balloon using a captive gas as the lifting means must have an automatic valve or appendix that is able to release gas automatically at the rate of at least three percent of the total volume per minute when the balloon is at its maximum operating pressure.

(d) Each hot air balloon must have a means to allow the controlled release of hot air during flight.

(e) Each hot air balloon must have a means to indicate the maximum envelope skin temperatures occurring during operation. The indicator must be readily visible to the pilot and marked to indicate the limiting safe temperature of the envelope material. If the markings are on the cover glass of the instrument, there must be provisions to maintain the correct alignment of the glass cover with the face of the dial.

[Doc. No. 1437, 29 FR 8258, July 1, 1964, as amended by Amdt. 31-2, 30 FR 3377, Mar. 13, 1965]

### **§ 31.51 Ballast.**

Each captive gas balloon must have a means for the safe storage and controlled release of ballast. The ballast must consist of material that, if released during flight, is not hazardous to persons on the ground.

### **§ 31.53 Drag rope.**

If a drag rope is used, the end that is released overboard must be stiffened to preclude the probability of the rope be-

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coming entangled with trees, wires, or other objects on the ground.

### **§ 31.55 Deflation means.**

There must be a means to allow emergency deflation of the envelope so as to allow a safe emergency landing. If a system other than a manual system is used, the reliability of the system used must be substantiated.

[Amdt. 31-2, 30 FR 3377, Mar. 13, 1965]

### **§ 31.57 Rip cords.**

(a) If a rip cord is used for emergency deflation, it must be designed and installed to preclude entanglement.

(b) The force required to operate the rip cord may not be less than 25, or more than 75, pounds.

(c) The end of the rip cord to be operated by the pilot must be colored red.

(d) The rip cord must be long enough to allow an increase of at least 10 percent in the vertical dimension of the envelope.

### **§ 31.59 Trapeze, basket, or other means provided for occupants.**

(a) The trapeze, basket, or other means provided for carrying occupants may not rotate independently of the envelope.

(b) Each projecting object on the trapeze, basket, or other means provided for carrying occupants, that could cause injury to the occupants, must be padded.

### **§ 31.61 Static discharge.**

Unless shown not to be necessary for safety, there must be appropriate bonding means in the design of each balloon using flammable gas as a lifting means to ensure that the effects of static discharges will not create a hazard.

[Amdt. 31-2, 30 FR 3377, Mar. 13, 1965]

### **§ 31.63 Safety belts.**

(a) There must be a safety belt, harness, or other restraining means for each occupant, unless the Administrator finds it unnecessary. If installed, the belt, harness, or other restraining means and its supporting structure must meet the strength requirements of Subpart C of this part.

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(b) This section does not apply to balloons that incorporate a basket or gondola.

[Amdt. 31-2, 30 FR 3377, Mar. 13, 1965, as amended by Amdt. 31-3, 41 FR 55474, Dec. 20, 1976]

### § 31.65 Position lights.

(a) If position lights are installed, there must be one steady aviation white position light and one flashing aviation red (or flashing aviation white) position light with an effective flash frequency of at least 40, but not more than 100, cycles per minute.

(b) Each light must provide 360° horizontal coverage at the intensities prescribed in this paragraph. The following light intensities must be determined with the light source operating at a steady state and with all light covers and color filters in place and at the manufacturer's rated minimum voltage. For the flashing aviation red light, the measured values must be adjusted to correspond to a red filter temperature of at least 130 °F:

(1) The intensities in the horizontal plane passing through the light unit must equal or exceed the following values:

Position light	Minimum intensity (candles)
Steady white .....	20
Flashing red or white .....	40

(2) The intensities in vertical planes must equal or exceed the following values. An intensity of one unit corresponds to the applicable horizontal plane intensity specified in paragraph (b)(1) of this section.

Angles above and below the horizontal in any vertical plane (degrees)	Minimum intensity (units)
0 .....	1.00
0 to 5 .....	0.90
5 to 10 .....	0.80
10 to 15 .....	0.70
15 to 20 .....	0.50
20 to 30 .....	0.30
30 to 40 .....	0.10
40 to 60 .....	0.05

(c) The steady white light must be located not more than 20 feet below the basket, trapeze, or other means for carrying occupants. The flashing red or white light must be located not less

than 7, nor more than 10, feet below the steady white light.

(d) There must be a means to retract and store the lights.

(e) Each position light color must have the applicable International Commission on Illumination chromaticity coordinates as follows:

(1) *Aviation red*—

$y$  is not greater than 0.335; and  $z$  is not greater than 0.002.

(2) *Aviation white*—

$x$  is not less than 0.300 and not greater than 0.540;

$y$  is not less than  $x - 0.040$  or  $y_0 - 0.010$ , whichever is the smaller; and

$y$  is not greater than  $x + 0.020$  nor  $0.636 - 0.0400x$ ;

Where  $y_0$  is the  $y$  coordinate of the Planckian radiator for the value of  $x$  considered.

[Doc. No. 1437, 29 FR 8258, July 1, 1964, as amended by Amdt. 31-1, 29 FR 14563, Oct. 24, 1964; Amdt. 31-4, 45 FR 60179, Sept. 11, 1980]

## Subpart E—Equipment

### § 31.71 Function and installation.

(a) Each item of installed equipment must—

(1) Be of a kind and design appropriate to its intended function;

(2) Be permanently and legibly marked or, if the item is too small to mark, tagged as to its identification, function, or operating limitations, or any applicable combination of those factors;

(3) Be installed according to limitations specified for that equipment; and

(4) Function properly when installed.

(b) No item of installed equipment, when performing its function, may affect the function of any other equipment so as to create an unsafe condition.

(c) The equipment, systems, and installations must be designed to prevent hazards to the balloon in the event of a probable malfunction or failure.

[Amdt. 31-4, 45 FR 60180, Sept. 11, 1980]

## Subpart F—Operating Limitations and Information

### § 31.81 General.

(a) The following information must be established: